Overview of Proposal to Sample Buildings for the Presence of World Trade Center Dust

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World Trade Center Expert Technical Review Panel

Background

- This presentation will review the proposal for sampling to determine the extent of WTC impacts.
- This proposal was the result of EPA staff efforts, as well as the deliberations of the panel. A draft for public comment and review was posted on the Panel's home page on October 15.
- Today's presentation will emphasize necessary steps towards the realization of this sampling plan.

Objectives

(1) To estimate the geographic extent of WTC contaminants of potential concern (COPCs) resulting from the building collapse and fire plume by surveying residential and non-residential buildings in lower Manhattan that volunteer to participate.

Sub-objectives will be to relate results of the survey to building cleaning history and to the role of central heating, ventilation and air conditioning (HVAC) if the information collected will support such an analysis;

(2) To provide the data necessary to determine if a Phase II sampling should proceed, which will test for the presence of collapse and fire plume residues in areas beyond the boundaries of the areas currently tested, and to provide the data necessary to determine whether and what further actions are warranted; and

(3) To validate a method to identify a signature for WTC dust and/or combustion products.

Components of the Study

- Spatially-balanced strategy to select sampling locations from a list of volunteer buildings, including stratification.
- Unit, building and HVAC sampling approach laid out.
- WTC Signature Study to determine building collapse and fire signatures ongoing.
- Procedures for dust sampling for COPCs and signatures being evaluated.

Spatially Balanced Sampling

- Developed to select probability samples of environmental populations.
- Samples that are approximately evenly dispersed over the area to be sampled are generally statistically more efficient than simple random samples.
- The technique is very general and can be applied to a wide range of populations that can be defined in terms of two dimensional coordinates.
- Stevens, D. L., Jr. and A. R. Olsen (2004). "Spatially-balanced sampling of natural resources." J. of American Statistical Association 99(465): 262-278.

RESEARCH & DEVELOPMENT

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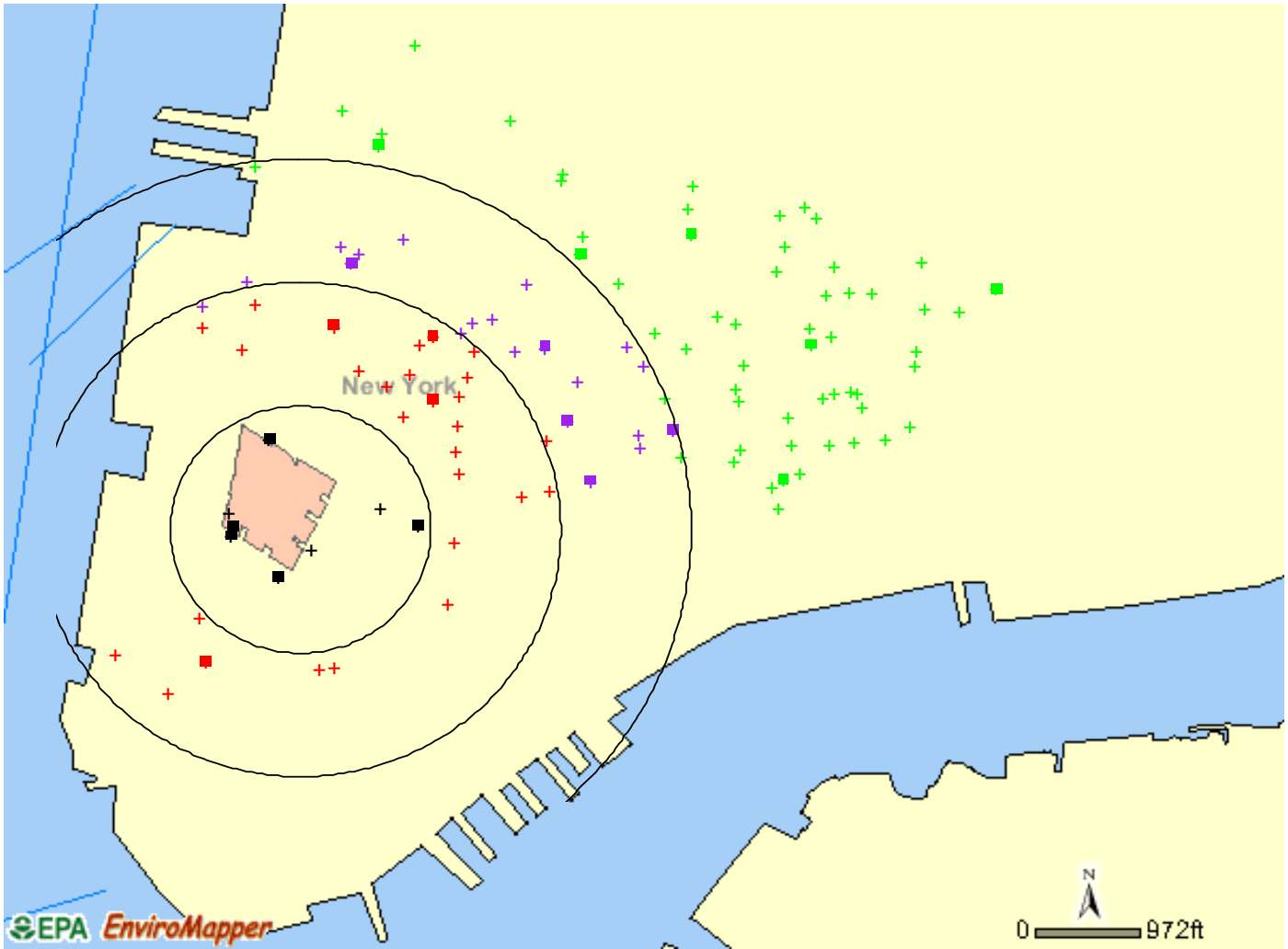
Example of Spatial Balanced Sampling Keyed to Distance from Ground Zero



Overall Approach for Building Selection

1) Develop list of public and private buildings that are eligible for selection.

2) Develop stratification variables which become identifying characteristics of buildings in population. Examples:
   -- distance from Ground Zero
   -- EPIC identified areas
   -- building type

3) Employ spatially balanced sampling software to make selection of buildings within strata.

Building, Unit, and HVAC Characterization

-- Sample 1 “unit” per 2 floors, facing Ground Zero.

-- Wipe samples plus vacuum samples to characterize “exposure areas” (table tops, rugs) and “non-exposure, inaccessible area” (tops of refrigerators, behind bookshelves)

-- Purpose of exposure samples is to facilitate cleanup decisions; purpose of inaccessible samples is to determine extent of WTC impact for decision making regarding further sampling.

-- For HVAC characterization, sample outlet, filter, mixing plenum, and inlet to indoor sampled area.

Benchmark Assignment

Health-based; Region 2 developed health-based benchmarks for PAHs and lead in dust for the 2002 Cleanup Program.

Three times background; which has precedence in Superfund National Priority Listing.

Background Data Sources

- 2002 WTC Background Study by EPA Region 2.
- Current WTC Signature and Methods Development Study.
- Other studies in NYC and literature.

Contaminant Benchmarks

COPC	Health-based benchmark		Background
Asbestos	N/A	microvac	2,783 f/cm^2
		wipe	37,174 f/cm^2
		wipe*	2,309 f/cm^2
MMVF	N/A		38 f/cm^2
Silica	N/A		N/A
PAH	150 µg/m^2		N/A
Lead	25 ug/ft^2		4 ug/ft^2

Notes:

* average of wipes with one exceedingly high outlier removed

-- N/A = not available

-- MMVF = man-made vitreous fibers

-- Asbestos and MMVF background from 2002 EPA Region 2 Study.

Decision Criteria

- For Unit Cleanup Offer:
  - Presence of signature and exceedance of at least one benchmark required.
  - If signature present but no COPC exceedance or if COPC exceedance but no signature, then a cleanup will not be offered.
- For Building Cleanup Offer:
  - 95% Upper Confidence Limit (UCL) on mean of all measurements in the building associated with WTC dust for at least one COPC exceeds benchmark, then cleanup is offered.

WTC Signature and Methods Development Study

- Goal is 10 “impacted” and 10 “unimpacted buildings”

- Purposes are manifold:
  - Collect enough sample for signature development and validation, and for establishment of background levels;
  - Determine appropriate methods for dust sample collection for both background and signature dust collection; candidates are wipe, microvac, HEPA vac.

Steps To Begin Sampling

- Finalize sampling plan
- Finalize methods
- Develop list of volunteer buildings